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Notes on Carex.—XVII.

By L. H. Bailey.

The most important recent extensions of the ranges of the carices are the finding of *Carex Assiniboinensis*, W. Boott, in Northern Minnesota, by F. F. Wood, and *C. alpina*, at Grand Marais, Minn., on Lake Superior; *C. torta*, in Washington county, Eastern Missouri, by H. Eggert; *C. capillaris*, on Mt. Kineo, Moosehead Lake, Maine, by Dr. G. G. Kennedy, and in Aroostook county, by M. L. Fernald. *Carex Assiniboinensis* is new to the United States, having been known heretofore only from the collections of Macoun in British America.

CAREX VERNACULA.

C. fœtida, American authors, not Allioni.

Distinguished from *C. fœtida*, its European congener, by stiffer and shorter leaves, shorter spikes, which give the head a more regular and compact look, and especially by much larger and broader and more or less prominently nerved perigynia.

This species, which is yet imperfectly known, inhabits the mountains from Colorado and Wyoming westward.

CAREX FETA.

C. straminea, var. *mixta*, Bailey, Proc. Amer. Acad. Arts and Sci. xxii. 151 (1886), not *C. mixta*, Raeusch.

The Pacific coast representative of *C. albolutescens* (*C. straminea*, var. *fœnea*), from which it differs in its much slenderer habit, more open and long heads, smaller spikes and perigynia. The peri-

gynia are loosely placed in the spike, giving the plant much the appearance of forms of *C. straminea* and *C. fœnea*. In the Botany of California it is variously referred to *C. lagopodioides*, *C. adusta*, *C. cristata*, var. *mirabilis*, and *C. scoparia*, var. *fulva*.

Carex lurida, var. PARVULA (Paine).

C. tentaculata, var. *parvula*, Paine, Cat. Oneida Pl. 105 (1865).

Low (8′ to 16′), very slender, with one or two spikes which are half or less the size of those in the type, sessile or very nearly so perigynia not more than half the size of those in the common form. A diminutive form growing along the Mohawk River, according to Paine; I have also collected it in Southern Vermont, and Professor Hitchcock sends it from Ames, Iowa.

Carex intumescens, Rudge, var. FERNALDII.

Very slender (about a foot and a half high), with leaves narrower than in the type; spikes reduced to one to three perigynia, which are erect and slender, being inflated less than half as much as those in the type.—Cedar Swamp, Aroostook county, Maine, 1893. M. L. Fernald, 127.

Forms of *C. intumescens* sometimes occur in dry woods, in which the spikes are reduced to one or two perigynia; but this variety differs in the slender perigynia which stand erect in the spike.

Carex debilis, Michx., var. INTERJECTA.

C. debilis Sartw. Exsicc. No. 118 (1848).

C. debilis β Boott, Ill. t. 273 (1860).

Tall and nearly or quite strict, with nearly erect spikes which are often compound at the base, very loosely flowered; perigynium shorter than in the var. *Rudgei*, the beak conspicuously less cylindrical. It differs from the var. *strictior* in the much narrower leaves and more loosely flowered spikes. Sartwell collected it at Penn Yan, N. Y., and Boott reports it from Pennsylvania by Townsend. Mr. C. L. Shear sends me specimens from Alcove, eastern New York, which is the first undoubted material I have obtained to match Boott's excellent plate and Sartwell's specimens. I do not know what its range may be. Undoubtedly various intermediate erect-spiked forms, which have always been a puzzling part of *Carex debilis* will need to be referred here. The

erect alternate-flowered spikes and short perigynia distinguish it from the common var. *Rudgei.*

Carex granularis, Muhl., var. RECTA, Dewey, Wood's Cl. Book, 1860, 763.

A very tall slender plant, with narrow erect leaves, narrow spikes, of which the lower are on very long and slender stalks; pergynium less inflated than in the type and straighter. Glaucous. Dewey records it from Southern Illinois (Vasey) and Louisiana (Hale). I have it from Virginia, Southern Illinois, the mountains of Georgia, and Mississippi. It is a well-marked form. No one seems to have taken up the variety except Paine, in his Catalogue of Oneida plants (1865); but Paine must have misunderstood it, for I do not know that it occurs in the North.

CAREX GRACILLIMA × ÆSTIVALIS?

Mr. C. L. Shear sends me from eastern New York, good specimens of a most distinct and novel carex. He first found the plant last year (1892), in a moist meadow at Alcove, Albany county. A single clump only was observed, and it grew with *C. gracillima.* In 1893 Mr. Shear found it again at two places in Greene county—between Windham and Ashland, and at Hunter —growing in clumps in mountain pastures. The plant differs visibly from *C. gracillima* in its much stricter habit, narrow leaves, nearly erect spikes, and by the distinctly beaked and toothed perigynium. Its association with *C. gracillima*, and the fact that it is uniformly wanting in good achenia, indicate that the plant is a hybrid. I am unable to determine what its other parent may be, but the fact that the perigynia are attenuated at the top, that the leaves are narrowed, the lower sheaths slightly pubescent, and the habit essentially erect, strongly suggest *C. æstivalis*, and this species occurs on the mountains of western Massachusetts and in eastern New York. I suspect that further search will discover *C. æstivalis* in the mountain pastures of Albany and Greene counties. It is by no means necessary to the diagnosis of a hybrid that both parents be found in its vicinity. One parent, or even both of them, may long since have died out and the hybrid may have persisted; yet the hybrid is usually associated with its pistillate parent. I have found undoubted hybrids of Rubus in

localities where but one parent could be formed. Nor is it strange that a hybrid should be found to have a somewhat wide distribution. *Carex arctata* × *castanea* (*C. Knieskernii*) occurs in New York, Minnesota and upon the Canadian side of Lake Superior; and I may add that *C. gracillima* × *hirsuta* was found at an early day, according to Dewey (Sill. Journ. xi. 315), at Newburgh, New York, and at Stockbridge, Mass., although it has been recorded by Torrey and subsequent writers as having been collected only at Phillipstown, near the Hudson. It is strange, however, if *C. æstivalis* is the missing parent of this beautiful carex, that the beak should be bifid, for both *C. gracillima* and *C. æstivalis* have entire orifices.

This is the third hybrid which seems to have had *Carex gracillima* for its mother. It is interesting to note, also, that this species often develops its perigynia apparently without the aid of pollination.

CAREX ÆSTIVALIS, while one of our rarer Carices, has received a variety of names. Its first name was *Carex Darlingtonii* given by Schweinitz, but the name was not published until Dr. Boott recorded it, as a synonym, in 1858. The original of this is now in the possession of the Philadelphia Academy of Sciences, and the ticket, in Schweinitz's hand, says that Darlington collected the plant upon the Pocono Mountains of northern Pennsylvania. M. A. Curtis also gave it the name *Carex tabularia* in his herbarium, and this name was also published as a synonym by Boott. A specimen bearing this name, and coming from Boott, is in the Torrey Herbarium. Kunze called the plant *Carex Rugeliana* in his "Supplemente zu Schkuhr's Riedgräsern," which was published at intervals from 1840 to 1850. I am not sure of the date of this name, but it is held to be later than Curtis' *Carex æstivalis*, which Dr. Gray published in 1842. Finally, Olney, in his Exsiccatæ, 1871, made it a variety of *Carex virescens*, with which it has no immediate affinity. The affinity of the plant is with *Carex gracillima*, of which John Carey thought, "if not distinct, it is a mountain form." Dewey confounded it with *Carex arctata* and *Carex sylvatica*. But it is abundantly distinct. Its northernmost station is Saddle Mountain, in western Massachusetts, where Dewey found it in 1828, at 800 feet above the base of the mountain.

THE STRAMINEA GROUP:

Willdenow described, in 1809, the plant which has long been known as *Carex adusta*, under the name of *C. fœnea*. The description was not understood, however, and Torrey, in 1836, applied Willdenow's name to the plant which is now known as *C. straminea*, var. *fœnea*. These two *fœneas* now stand, applied to plants very like each other, and the circumstance is confusing. I shall, therefore, find some other name for the *C. straminea* var. *fœnea* of Torrey, especially as I believe the plant merits specific distinction. It was first described by Schweinitz in 1824, as *Carex albolutescens*, and this name I now restore. Unfortunately, Olney misunderstood Schweinitz's plant and thought it to be the *C. adusta* of our manuals. I have seen Schweinitz's original, and it is clearly Torrey's *fœnea*. There are forms which are somewhat intermediate between *Carex straminea* and *C. albolutescens*, but one who is familiar with the two species can easily place them. But I separate them in order to allow of a philosophical presentation of *C. straminea* and its varieties. This species, as heretofore constituted, includes two coördinate branches or type, the stramineous or straw-colored and the albolutescent or silvery green type. If these types are considered to be coördinate varieties, it is impossible to recognize several minor forms, which appear to be worthy varietial recognition, unless resort is taken to the European fashion of sub-varieties. By removing the albolutescent type, I am able to separate some of the well-marked forms which now confuse *C. straminea* var. *brevior* into coördinate varieties. The forms which I desire to remove from it are:

Carex straminea, var. FERRUGINEA (Gray).
C. fœnea, var. β Boott. Ill. 118, t. 376 (1862).
C. fœnea, var.? *ferruginea*, Gray Man. 5th ed. 580 (1867).
C. tenera, var. *suberecta*, Olney, Exsicc. fasc. ii. No. 16 (1871).

Plant very tall and slender, with two or three pointed or long-ovate, rusty-green spikes approximate at the top. The spikes are usually prominently tapering below, and the thin, nearly nerveless perigynia have loose points. That has somewhat the look of some forms of *C. scoparia*, but is always readily distinguished by its separated spikes and *straminea*-like perigynia. I

know it only from Ohio and Illinois, but it must have a wider range.

C. straminea, var. CRAWEI, Boott, Ill. 121, t. 388 (1862).

C. straminea, var. *Meadii*, Boott, l. c. t. 389.

Robust forms with very large heads and mostly round, loose spikes, with very broad, long-pointed perigynia, which easily shell off when ripe. From Connecticut and New Jersey to Illinois; evidently more common westward.

CAREX ALBOLUTESCENS, Schw. Ann. N. Y. Lyc. i. 66 (1824).

C. straminea, var. *fœnea*, Torr. Monogr. 395 (1836), not *C. fœnea*, Willd. (1809).

C. straminea, var. β Gay, Ann. Sci. Nat. 2d ser. x. 362 (1838).

C. leporina, var. *bracteata*, Liebm. Mex. Halv. 264 (1850).

C. straminea, var. *chlorostachys*, Bœckl. Linnæa, xxxix. 118 (1875).

Var. CUMULATA (Bailey).

C. alata, var. *pulchra*, Olney (mostly), Exsicc. fasc. ii. No. 23 (1871).

C. straminea, var. *cumulata*, Bailey, Mem. Torr. Bot. Club, i. 23 (1889).

CAREX ECHINATA, AND ITS AMERICAN CONGENERS:

The American plants which have been variously known as *Carex echinata*, *Carex stellulata*, *Carex sterilis* and *Carex scirpoides* have been the subject of more neglect than any other American carex, perhaps more, even, than any other of the older species of our flowering plants. This lack of attention is due both to the polymorphous character of the species and to the uncertainty of a specific identification with the European plant. Every collector must have noticed that all printed descriptions of the species are singularly unsatisfactory, and that widely different forms are thrown loosely under one name. The species is not an attractive one at best. I have long felt that the plant has never been understood, and for two or three years I have made a special effort to collect material for study. The arrangement of this material, which I now propose, seems to solve the difficulties which have always attached to the species. The solution of the perplexities turns upon two questions:

1. Is the American plant identical with the European? Over thirty years ago Francis Boott questioned if the American plant is the same as the European *C. stellulata* (or *C. echinata*), but no monographer since Muhlenberg seems to have eliminated the European species from our flora. The plants of the two continents are exceedingly similar, and yet there is a facial difference between them which is nearly always apparent and often striking. Definite specific characters of separation are obscure, and yet I am convinced that they exist. The American plant is habitually taller than the European, the scales are sharper and usually longer, the perigynia are more strongly nerved and more attenuated or conical, and, above all, it is far more variable. The history of American *Carex* literature is a continuous record of the separation of American and European types. There are probably no species common to both countries, except those which are hyperboreal and occur through the Arctic regions of both hemispheres, being found in Greenland. There are other supposed identical species, aside from *Carex echinata*, which, I think, will eventually be separated in the two continents. I am satisfied that the American species under consideration can never be properly understood until it is treated independently of the European plant.

2. Is the American species monotypic? Any acute observer would at once see that our so-called *Carex echinata* contains two distinct general types, if the specimens were spread before him; and, fortunately, these facial attributes are reinforced by excellent specific characters. One type, to which the *Carex sterilis* of Willdenow and the *C. scirpoides* of Schkuhr belong, is characterized by distinctly long-beaked spreading or ascending winged perigynia, and loose, bushy yellowish spikes; the other, which has no name, is marked by very short-beaked, small and nearly wingless perigynia, which are spongy and more or less cordate at the base and which shell off upon the sheet, and by more rounded or cylindrical greenish spikes—the terminal one often oblique—in which the perigynia are strongly divaricate or often bent downwards. And aside from these, the stiff and wide-fruited sea-board plant—known as var. *conferta*—will be seen to have ample specific characters. I have, therefore, outlined three species from the material

heretofore thrown loosely into *Carex echinata*. This, I hope, will be better than detailing a mere list of varieties which should have no coherence, and which should differ from each other in the very terms by which the species is distinguished from its fellows. These plants may be outlined as follows:

CAREX STERILIS, Willd. Sp. Pl. iv. 208 (1805). Sartwell Exsicc. No. 37. Boott. Ill. t. 146.

C. scirpoides, Schkuhr, Riedgr. Nachtr. 19, fig. 180 (1806).

C. stellulata, vars. *scirpoides* and *sterilis*, Carey, Gray's Man. 1848, 544.

C. echinata, var. *microstachys*, Boeckl. Linnæa, xxxix. 125 (1875).

C. echinata, var. *microstachya*, Boeckl. Flora, 1875, 563.

C. echinata, var. *micrœarpa*, Bailey, Coulter's Rocky Mt. Bot. 395 (1885).

Short, stiff and erect (usually not much exceeding a foot in height), the old leaves often persistent; head tawny or greenish-yellow, short, composed of from three to five small loosish contiguous spikes, of which the uppermost is usually conspicuously attenuated at the base by the presence of staminate flowers; sometimes the terminal spike or even the whole head is entirely staminate; perigynium thin and flat, conspicuously contracted into a slender beak which is nearly or quite as long as the body and spreading so as to give the spike an echinate appearance, sharp-edged and rough on the upper margins, variously nerved and very sharply toothed.—A common plant, growing in dryish bogs and swales throughout the Northern States east of the Mississippi; and I also have it from Willow Springs, Arizona (*Palmer*, 548), and Mt. Adams, Oregon (*Henderson*). The plants of Willdenow and Schkuhr seem to have been variously understood by successive botanists, although the figures of both *C. sterilis* (fig. 146) and *C. scirpoides* (fig. 180) in Schkuhr's "Riedgräser" are unequivocal. I have also seen the originals of both plants. The dioeciousness of the species seem to be only an occasional state, and as I have not been able to discover other characters which uniformly accompany it, I have thrown *C. sterilis* and *C. scirpoides* together.

Var. EXCELSIOR.

C. stellulata and *C. echinata*, American authors. Sartwell, Exsicc. no. 35.

C. sterilis β Boott, Ill. 56, t. 146* (1858).

Taller and more slender (often two feet high), the heads usually more scattered and mostly somewhat greener.—Common in wet bogs and woods, apparently in all the Northern States; occurs also in Louisiana, Mexico, and in Oregon and Vancouver Island.

Var. CEPHALANTHA (Bailey).

C. echinata, var. *cephalantha*, Bailey, Mem. Torr. Bot. Club, i. 58 (1889).

Rather stiff but slender and tall, or the top of the culm weak (1–2 feet high); head mostly continuous or more or less dense and composed of five to eight approximate (rarely scattered), large (15–30 flowered) green or greenish loose spikes, in which the mature narrow, long-beaked perigynia usually spread at nearly or quite right angles.—Runs across the country from the northern borders of the United States northward, from the Atlantic to the Pacific, reaching as far south as the higher elevations in northeastern Pennsylvania. There are two forms in this, one (the type) marked by aggregated spikes, and one by more or less scattered spikes. The latter may be worth varietal recognition.

Var. ANGUSTATA (Carey).

C. stellulata, var. *angustata*, Carey, Gray's Man. 1848, 544.

C. echinata, var. *angustata*, Bailey, Mem. Torr. Bot. Club, i. 59 (1889).

Very slender, sometimes almost thread-like, weak, bearing long and narrow divaricate perigynia, which are either in loose small heads or in scattered spikes.—New England to Newfoundland. Apparently also in Montana.

CAREX ATLANTICA.

C. stellulata, var. *conferta*, Chapm. Fl. S. States, 534 (1860), not *C. conferta*, Koch.

C. echinata, var. *conferta*, Bailey, Carex Cat. (1884).

Tall (16 to 24 inches) and very stiff and strong, the leaves broad but stiff and usually becoming somewhat involute when dry; spikes contiguous or scattered, spreading, globular or short-cylindrical, densely flowered, green; the terminal one slenderly contracted below or even entirely staminate; perigynium large and very broad (the body about as broad as long), with a distinct

rough, bifid beak, strongly many-nerved, especially upon the back, squarrose or usually retrorse at maturity, shelling off readily when ripe.—Follows the coast from Newfoundland to Florida; not common. It is strange that none of the earlier students of the genus discovered this distinct plant.

CAREX INTERIOR.

C. scirpoides, Sartwell, Exsicc. No. 36 (1848). *C. stellulata*, var. *scirpoides*, Boott, Ill. t. 146** (1858).

Very slender, but mostly strict (1–2 feet high), the thin wire-like culms usually longer than the narrow and rather soft grass-like leaves; head composed of two to four little globular contiguous greenish-tawny spikes, of which the terminal one is usually slenderly contracted or stipe-like below and often oblique; perigynium very small and plump, the margins very narrow or almost none, lightly many nerved on the back, but usually nerveless or nearly so on the face, prominently corky at the base, the beak and the teeth very short, spreading or reflexed at maturity and easily shelling off.—Bogs and swamps, in the interior country, from Maine to Minnesota and Kansas. When this plant is once understood, I am sure that its identity cannot be mistaken. The utter confusion in which our *Carex echinata* has always lain, must be the only reason why the plant was not separated long ago. Boott knew that it is distinct from *C. sterilis*, but he made the mistake of trying to identify it with Schkuhr's *C. scirpoides*. But Schkuhr's plant, as his plate plainly shows, was a short, stiff, fulvous plant with oblong spikes and long-beaked broad-winged perigynia.

VAR. CAPILLACEA.

Still more slender or even bristle-like in both culm and leaves, and habitually lower (sometimes 16 inches, but often only half as high); perigynium more cordate at the base and broader, strongly many-nerved upon both sides.—Eastern Massachusetts, New Jersey and Central Pennsylvania. Perhaps specifically distinct from the last. My attention was first called to this plant some years ago by the late William Boott, who was once inclined, I think, to publish it.

HOMONYMOUS NAMES.

The Committee on Nomenclature of the Botanical Club adopted, at Rochester, an article which declares that "the publication of a generic name or a binomial invalidates the use of the same name for any subsequently published genus or species, respectively." This rule, I am instructed, is to be enforced rigidly in the forthcoming Check List to be issued officially by the Club. The committee has also decided, by a recent vote upon *Carex Michauxiana* and *C. Michauxii* as a test case, that proper names differing only in their terminations are homonymous. It is with much regret and hesitation that I apply this rule to the carices of the Check List, although I fully sympathize with it. While the necessary changes are not numerous, they involve some of our best known species. The innovations which follow as a direct or indirect result of the homonymy of the Check List are as follows:

CAREX ABACTA.

C. rostrata, Michx. Fl. Bor. Am. ii. 173 (1803), not Stokes in With. Arrang. Brit. Pl. 2d ed. 1059 (1787).

C. xanthophysa, vars. *nana* and *minor*, Dewey, Sill. Journ. xiii. 353, figs. 57, 58 (1828), not *C. nana* Lam., nor Cham. nor Boott; *minor* has been frequently used in the genus.

C. Michauxiana, Bœckl. Linnæa, xli. 336 (1877), not *C. Michauxii*, Schw. (1824), nor Dewey (1826).

CAREX ABBREVIATA, Schw. in herb.; Boott. Linn. Trans. xx. 141 (1846); Ill. 21 (1858). *C. Torreyi*, Tuckm. Enum. Meth. 21 (1843), not *C. Torreyana*, Schw. (1824), nor Dewey (1826).

Boott originally attributed the herbarium name *abbreviata* to Prescott, but it was really Schweinitz's, and the error is corrected in Boott's Illustrations, i. p. 21.

CAREX ASA-GRAYI.

C. intumescens, var. *globularis*, Gray, Ann. N. Y. Lyc. iii. 236 (1834), not *C. globularis*, Linn.

C. Grayii, Carey, Sill. Journ. 2d ser. iv. 22 (1847), not *C. Grayana*, Dewey (1834).

Var. HISPIDULA (Gray).

C. Grayii, var. *hispidula*, Gray in herb.; Bailey, Mem. Torr. Bot. Club, i. 54 (1889).

CAREX AUSTRO-CAROLINIANA.

C. Caroliniana, Buckley, Sill. Journ. xlv. 173 (1843), not. Schw. (1824).

Table Mountain, South Carolina.

CAREX COLLINSII, Nutt. Gen. N. Am. Pl. ii. 205 (1818).

C. subulata, Michx. Fl. Bor.-Am. ii. 173 (1803), not Gmelin, Syst. ii. part i. 138 (1791), nor Schumch. Faell. i. 270 (1801), nor Wahl.

C. Michauxii, Dewey, Sill. Journ. x. 273 (1826).

CAREX DURIFOLIA.

C. Backii, Boott; Hook. Fl. Bor.-Am. ii. 210, t. 209 (1840), not *C. Backana*, Dewey (1836).

CAREX FRANKII, Kunth, Enum, Pl. ii. 498 (1837).

C. atherodes, Frank, Hb. Unio. Itin. (1835), not Sprengel (1826).

C. stenolepis, Torr. Monogr. 420 (1836), not Lessing, Reise durch Norwegen (1831).

So long ago as 1843 Kunze observed that Torrey's *C. stenolepis* is antedated by Lessing's, and Gray called attention to the fact in Silliman's Journal in 1844.

CAREX LOUISIANICA.

C. Halei, Carey, Chapm. Fl. S. States, 543 (1860), not Dewey (1846).

Florida to Louisiana and Texas and Arkansas.

CAREX MEMBRANOPACTA.

Carex compacta, R. Br. Ross's Voy. Append. cxliii. (1819), not Krock. Fl. Sil. iii. (1814).

Carex membranacea, Hook, Parry's 2nd. Voy. Append. 406 not Hoppe, Ic. 71.

Carex saxatilis, var. *compacta*, Dewey, Sill. Journ. xi. 321 (1826).

Arctic America.

CAREX QUALICUMENSIS.

C. Macounii, A. Bennett; Macoun, Cat. Can. Pl. iv. 147 (1888), not Dewey (1866).

C. salina, var? *robusta*, Bailey, Bot. Gaz. xiii. 87 (1888), not *C. robusta*, Hochst.

Grows in large patches between tides in the bed of Qualicum River, Vancouver Island.

CAREX WALTERIANA.

C. striata, Michx. Fl. Bor. Am. ii. 174 (1803), not Gilib. Exerc. Phyt. ii. 550 (1792); Boott, Ill. t. 151 (1858).

Carolina to Florida. Now renamed in memory of Thomas Walter, author of Flora Caroliniana, 1788.

VAR. BREVIS (Bailey).

C. striata, β Boott, Ill. 57 (1858).

C. striata, var. *brevis*, Mem. Torr. Bot. Club, i. 34 (1889).

New Jersey to North Carolina.

New Genera of Plants from Bolivia.

BY H. H RUSBY.

(PLATES CLXVII.–CLXX.)

MALPIGHIACEÆ.

Of Bentham and Hooker's four tribes of Malpighiaceæ, my first genus differs from the first in its pyramidal torus; from the second in its non-climbing habit, and wingless fruits, combined with two-formed stamens and appendaged anthers; from the third by its wingless fruits and two-formed anthers, and from the fourth by its 10 stamens, those alternate with the petals being the defective ones. Its habit is certainly at agreement with the last tribe, and it would easily pass, without dissection, for a species of *Camarea;* but the androecium and general reproductive characters separate it widely therefrom. All things considered it appears most closely related to the first tribe, where I place it, making an exception as to its gynobase, between the genera *Acmanthera* and *Pterandra.*

BRITTONELLA.

Caylx ample, foliaceous, somewhat accresent, deeply 5-parted, 8-glandular, the glands ovoid and of medium size. Petals 5, on short claws, concave and incurved, the margins wavy and erose-dentate, in this species at least yellow. Stamens 10, sub-distinct, of 2 forms; those opposite the petals perfect, the filaments stout, dilated downward, glabrous, their anthers affixed at the outer base, partly deflexed, slightly winged at the base and appendaged with

a small point; those alternating similarly formed, but much smaller and apparently imperfect, the anthers scarcely appendaged. Carpels 3, distinct, on a short pyramidal gynobase; ovary pilose, the apex slightly 3-dentate; style ventral, linear, truncate or the stigma slightly capitellate. Nuculæ 2 or even only 1, irregularly triangular-ovate, irregularly 3 cristate at the upper portion and corrugated. Seed (immature) ventrally affixed, ovoid, pointed. Perennial, fruticulose, sub-prostrate, hirsute, with opposite glandless leaves, and small, foliaceous stipules, similar to the leaves. Flowers solitary at the ends of the branches, peduncled.

Dedicated to my distinguished friend, Dr. Nathaniel L. Britton.

B. PILOSA. Suffruticulose, 5–10 cm. high, pilose throughout; root vertical, stout; branches ascending; stipules 2–3 mm. long, 1.5–2 mm. broad, ovate, very acute, foliaceous; petioles scarcely any; leaves .75–1.5 cm. long, .5–1 cm. broad, ovate, acute, the base rounded or subcordate, strongly veiny underneath; flowers about 5 mm. broad, the sepals 4 mm. long, oblong-ovate, the petals somewhat longer; fruit not mature.

Collected near Cochabamba by Mr. Miguel Bang (No. 935).

RUBIACEÆ.

Its numerous ovules, capsular fruit, solitary flowers, winged seeds, regular corolla, and embryo in albumen, fix my second genus in the Cinchoneæ. There being no proper bud I cannot be sure that the corolla is valvate, though it is apparently so. But the plant apparently has no affinity with any of the genera of the second section, with imbricate or convolute corolla, notwithstanding a certain similarity in habit with two of them. It therefore belongs in the Eucinchoneæ, in which, as shown by its loculicidal capsule and placentæ adnate to the middle of the septum, it is allied to a group of 8 genera, from each of which it is quite distinct in habit and structure. It is most nearly related to *Bouvardia*, and I place it between this and the little known genus *Heterophyllæa*.

LECANOSPERMA.

Calyx tube ovoid-campanulate, tuberculate, the limb 5-parted, the segments foliaceous and somewhat coriaceous, narrow. Corolla thick and tough, the tube elongated, very slender, the throat slightly dilated and the mouth again slightly contracted, villous within at the anther ring, the limb 5-lobed, the lobes ample, horizontally spreading or recurved. Stamens (dimorphous?) 5, fila-

ments wanting, inserted into the base of the throat, the anthers included, linear oblong, dorsifixed, the base entire. Disk not prominent, fleshy; ovary 2-celled; style filiform, included or barely exserted, the branches 2, linear. Placentæ fixed along the central portion of the septum, the ovules rather numerous in the cells. Capsule globular, costate, the calyx limb imperfectly deciduous, crustaceo-cartilaginous, imperfectly loculicidal, the septum delicate, early separating from the walls to simulate a one-celled capsule. Seeds rather few, peltate, pendulous, imbricated in two ranks in each cell, circular, saucer-shaped, both as to the body of the seed and by the incurved wing. Embryo straight, in semi-corneous albumen, with well-developed caulicle and cotyledons.

A much branched ragged shrub (or tree?) with short spine-like leafy branchlets, the leaves minute, oblong-linear, semi-fleshy, crowded, the stipules obscure, somewhat sheathing.

Named in allusion to the striking saucer-shaped seeds.

L. LYCIOIDES. Bark gray, branches numerous, divergent, very unequal, rigid, leaves 3–5 mm. long, 1–2 mm. broad, on very short petioles, elliptical-oblong, entire, thickish, below granular, roughened, with prominent mid-rib, drying blackish; flowers (color?) terminal, solitary, peduncled; calyx 4 mm. long, the lobes 3 mm. long by .5 mm. broad, strap-shaped, slightly broadened upward, thickish, obtuse, the sinuses open; corolla nearly 2 cm. long, the tube very slender, the spreading limb nearly 1 cm. broad, the lobes broadly ovate, acutish; fruit pendulous on stout, very tough peduncles, globular, light-brown, 6 mm. in diameter, 10-costate; seeds nearly 3 mm. broad, hispid. Collected by Mr. Miguel Bang near Cochabamba (Nos. 1121 and 1122). Distributed as "Randia."

COMPOSITÆ.

My third genus has the homogamous, tubuliflorous heads, the sub-entire anther base, the sub-terete, obtuse, papillose style-branches, and the setose pappus of the 2d tribe, Eupatoriaceæ. Of its 3 sub-tribes, it has the appendaged anthers and the 5-angled akene of the Agerateæ. The pappus, entirely setaceous and of numerous setæ, exclude it from the 1st group of this sub-tribe. Between the 2d and 3d sections it is difficult to decide, as one of these is described as "*insigniter barbellata*," the other "*breviter barbellata*." On the whole, however, its affinities seem rather with the more strongly barbellate first section, notwithstanding that

Bentham relegated it to the second, as a species of *Eupatorium*. With none of the 6 genera of this first section does it agree. It appears to belong between (64) *Agrianthus* and (65) *Symphyopappus*, both Brazilian genera. Its most distinct characters are its spine-tipped involucral scales in 4 strictly vertical ranks, giving a perfectly regular quadrangularly prismatic involucre, and the very unequal rigid purple setæ of the pappus.

ADDISONIA.

Head homogamous, tubuliflorate and panciflorate. Involucre narrow, prismatic-quadrangular; scales about 12 to 14, in 4 vertical ranks, the outer successively shorter, the outermost very small, rigid, roughened, strongly keeled, produced into a spine-like tip. Receptacle naked, elevated and prominent as an irregularly and sharply angled body. Corollas equal, tubular, the limb campanulate, its border spreading, strongly 5-toothed. Anthers with obtuse triangular appendages and obtuse, nearly entire bases. Style-branches long, much exserted, obtuse, distinctly dilated upward, papillose. Achenia sharply 5-angled. Pappus wholly of setæ in a single series, easily detached altogether with the disc, 25–30, very unequal, rigid, stout, purple, moderately barbellate.

A tough (glutinous?) shrub, with elongated, appressed, erect-spreading branches; alternate, sessile, very small, linear spatulate, fleshy, papillose leaves, and heads solitary at the ends of abbreviated leafy branchlets, these crowded at the ends of the branches. The involucre, rigid, purple pappus and corolla characters are suggestive of *Stevia*, while the general habit is that of *Ageratella*. Specimens of the same plant, collected by Pearce, in the Kew herbarium are marked by Mr. Bentham "*Eupatorium*," but no species is named.

Genus dedicated to the honored President of the Torrey Botanical Club, Judge Addison Brown.

A. VIRGATA. Branches very slender, bright brown, slightly channelled, the internodes shorter than the leaves; leaves 5–12 mm. long, 1–2 mm. broad, linear-spatulate, below narrowed to a petiole-like base, obtusish, very thick, grayish-green, papillose with prominent broad midrib; heads virgately racemed and somewhat secund, at maturity 9 mm. long, 3–3.5 mm. broad. Involucre 6–7 mm. long by 3 mm. broad, regularly tapering to an acute base; the scales rigid, lanceolate boat-shaped, above keeled, with scarious spreading margins and pungently tapering apex, finely several-nerved, papillose; flowers about 5; corolla dull yellowish-white, 5 mm. long, 5-toothed, the teeth spreading, acutish; pappus bright purple,

rather coarse, rigid, shortly barbellate, somewhat flexuose, very unequal, some of the setæ exceeding the corolla; achenia oblong with tapering base, 2 mm. long, brown, sharply ribbed. Collected in Southern Bolivia by Mr. Miguel Bang (No. 868). Perhaps distributed as "Chuquiragua."

VACCINIACEÆ.

A conclusion as to the generic rank of my fourth and last plant is not entirely free from doubt, but I cannot conscientiously describe it as a Vaccinium, the only genus which it resembles in structure. All generic divisions, both of the Vacciniaceæ and Ericaceæ are perhaps radically wrong. We have either far too many or far too few genera. If as I consider most probable, the present living members of these families represent a vastly greater number of extinct species, then the characteristics of the anthers constitute good generic characters, and many of our sub-genera may properly constitute monotypic or small genera. If on the other hand, these characteristics are trifling,,there should be a considerable reduction of the genera. It is greatly to be desired that the paleontology of this group should be studied out.

From *Vaccinium* our plant differs in its absolutely solitary, many-bracted flowers, the pedicel continuous—not articulated—with the calyx, the calyx prismatic, and especially by the entire placentæ.

VACCINIOPSIS.

Calyx continuous with the pedicel, the tube turbinate, strongly 5-angled, the limb broadly campanulate, deeply 5-toothed. Corolla scarlet, contracted-campanulate, strongly 5-toothed, the teeth recurved, within lightly pilose. Stamens 10, not coherent, lightly adherent to the base of the corolla, equal and similar, the filaments longish, hirsute and incurved above. Anthers adnate, coarsely pilose, the cells obscurely muticous on the back, each abruptly contracted into a simple, straight, rigid beak which opens on the inner face by an elongated oblique pore. Disk conspicuous, elevated, cylindrical, 10-grooved with concave summit. Style stout, elongated, of uniform thickness, truncate. Ovary lightly 5-lobed, 5-celled, the placentæ 5, strictly simple, from the inner angles, fleshy. Ovules very numerous. Fruit not seen.

A (parasitical ?) shrub, with much elongated, simple, slender branches, alternate, nearly sessile, ovate, 3–5 nerved, fleshy, pale leaves, and solitary, nearly sessile, axillary flowers, the pedicel and calyx-tube clothed with broad, appressed, imbricated scales.

V. OVATA. Branches nearly parallel, 10–30 cm. long, 1–2 mm. thick, channelled, the bark gray or slightly reddish gray, glabrous, the internodes 2–8 mm. long. Petioles 1.5–2 mm. long, nearly as broad, flattened, minutely pubescent. Leaves 2–2.5 cm. long, 1–1.5 cm. broad, ovate or some nearly oval, entire, revolute, the base rounded or very slightly narrowed, the apex with an obscure blunt point, very thick, 2 pairs of strong lateral nerves from near the base, below smooth, above rugose-reticulated; flowers, inclusive of the short concealed pedicel, nearly 1 cm. long; calyx-tube 2 mm. long and broad, the limb 5 mm. broad, its lobes triangular-ovate, acuminate, 2 mm. broad, thick, pale and smooth like the leaves; corolla scarlet, thick, sparsely and very minutely pubescent outside, urceolate, 5 mm. long by 4 mm. broad.

Collected by Mr. Miguel Bang in Southern Bolivia (No. 876).

Description of Plates.

Plate CLXVII.

Brittonella pilosa, Rusby. (1) Typical plant; (2) flower; (3) petal, front view; (4) same, side view; (5) essential organs *in situ;* (6) perfect stamen, showing face; (7) same, side view; (8) imperfect stamen; (9) gynoecium; (10) immature fruit, side view; (11) pyramidal torns with 2 sepals in background; (12) radial vertical section of fruit.

Plate CLXVIII.

Lecanosperma lycioides, Rusby. (1) Typical fruiting branch; (2) flower; (3) calyx and pistil; (4) corolla laid open to expose stamens; (5) capsule with portion removed, lateral view of placenta and seeds; (6) same, front view of placenta with seeds; (7) concave face of seed; (8) convex face of seed.

Plate CLXIX.

Addisonia virgata, Rusby. (1) Typical flowering branch; (2) head in flower; (3) outermost involucral scale; (4) innermost involucral scale; (5) complete flower; 6) 3 of the stamens; (7) style-branches.

Plate CLXX.

Vacciniopsis ovata, Rusby. (1) Typical flowering branch; (2) flower with bracted pedicel; (3) nude calyx with pistil; (4) corolla laid open to expose stamens; (5) a stamen, face view; (6) the same, side view; (8) transverse section of ovary.

The Extent of the Annulus, and the Function of the different Parts of the Sporangium of Ferns in the Dispersion of Spores.*

By Geo. F. Atkinson.

A study of the sporangia of the different families of ferns made to determine the character of the so-called "complete annulus" makes it necesary to place some restrictions upon the use of that term as applied to the part of the annulus concerned primarily in the dispersion of the spores.

In the Polypodiaceæ the annulus is said to be "incomplete." It extends from the distal end of the stalk over the dorsum and vertex of the sporangium to the anterior upper angle. The lip cells in the front possess thickened and lignified walls, and between them the line of cleavage occurs at the moment of dehiscence. Between the upper lip cell and the anterior end of the annulus are two or three cells with walls exactly like those of the lateral walls of the sporangium. Similar cells also exist between the lower lip cell and the distal end of the stalk at the lower angle of the sporangium. These cells serve as connectives between the lip cells and the anterior end of the annulus on the one hand and the stalk on the other. At the moment of dehiscence they serve as a pull upon the lip cells as the annulus is everting. The lip cells being situated at the middle of the front divide the sporangium in halves and the line of cleavage started continues straight across the lateral walls of the sporangium. The connectives serve also another very important function. They are passive like the lateral walls and thus the halves of the sporangium remain intact while the annulus is being everted and preparing to spring. By this means the spores are held in place until the annulus springs when they are hurled violently away.

In the Cyatheaceæ, Gleicheniaceæ, and Hymenophyllaceæ the annulus is said to be "complete," *i. e.*, it extends entirely around the sporangium.

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*The substance of this paper was presented before the botanical section of the A. A. A. S. at the Madison Meeting.

In *Cyathea brunonis* and *Cibotium chamissoi* of the Cyatheaceæ which I have examined, divisions strictly homologous with those pointed put in the Polypodiaceæ are found. The true annulus, *i. e.*, that portion which functions as the spring, extends from the lower anterior angle of the sporangium, backward by the side of the stalk, up the dorsum and over the vertex to the anterior upper angle. A series of four to six lip cells similar in appearance to, but smaller than those of the true annulus, occupies the middle of the front. Between two of these the line of cleavage occurs. An upper and lower connective, each consisting of two or three cells exactly like those of the lateral walls of the sporangium, interrupts the so-called "complete annulus." Sporangia of both these species, which had lain in the herbarium over thirty years, when moistened with water and then dried, or treated with glycerine to extract the water from the cells of the annulus, opened promptly by the everting of the part of the annulus here designated as the true annulus. The spring also occurred with as much snap seemingly as might have taken place at the time of the dehiscence of the sporangium. The entire proceeding could easily be watched under the high power of the microscope, and it was easy to see which part functioned as the spring and which part was passive.

In *Hymenophyllum demissum* and *H. ciliatum* the true annulus occupies a greater portion of the circumference of the sporangium than in the Cyatheaceæ, but it is not complete. The short stalk is attached nearly perpendicular to the sporangium by the side of one end of the annulus. Narrow elongated lip cells are present joined to the annulus by two small connectives, and in dehiscence the sporangium is divided into halves.

In the Gleicheniaceæ as shown by *Gleichenia emarginata* the same divisions are present, but the connectives are quite large and prominent, as shown when a longitudinal section of the annulus is made.

In *Schizæa pusilla* and *Aneimia Phyllitidis* of the Schizæaceæ elongated lip cells and small connectives are present, and the true annulus when seen in side view and in section stands out quite prominently from the other parts of the ring of cells at the summit of the ovate sporangium.

In *Osmunda regalis, cinnamomea*, and *Claytoniana*, and *Todea rivularis* the same parts are present, the true annulus being situated upon the dorsum of the sporangium.

In all these families the sporangium is divided into halves at the time of dehiscence. The true annulus, the connectives and the lip cells perform identical functions in all. Were the annulus in any of them "complete," the highly developed mechanism which now serves the fern so perfectly in the dispersion of the spores would be defeated. During the eversion of a "complete" annulus the lateral walls of the sporangium would be torn to pieces and the spores would fall to the ground before the spring took place, and the present comparatively wide dispersion could not take place.

BOTANICAL DEPARTMENT, CORNELL UNIVERSITY.

Notes Upon a New Exobasidium.*

The genus *Exobasidium* is interesting in standing almost alone as containing parasites in the large group Thelephoreæ of the Hymenomycetous Fungi. Authors have differed as to the place the genus should hold in the classification, but Saccardo ignoring the views of Schroter and others, disposes of it as above stated. He describes eleven species, eight of which according to Farlow's Index are American. Of these only one is upon a host outside of the Heath family, namely, *Exobasidium Symploci*, E. & M. on *Symplocos tinctoria*, L. Her. The American species on Ericaceæ may be tabulated with the hosts as follows:

1. *Exobasidium Vaccinii* (Fl.) Woron.

   On *Arbutus Menziesii, Arctostaphylus Uva-ursi, Cassiope tetragona, Gaylussacia resinosa, Rhododendron viscosum, Vaccinium macrocarpum, Vaccinium uliginosum, Vaccinium Vitis-Idaea.*

2. *Exobasidium Andromedæ*, Pk.

   On *Andromeda ligustrina.*

3. *Exobasidium Azaleæ*, Pk.

   On *Rhododendron nudiflorum.*

*Read before the Botanical Club, A. A. A. S., Madison, Wis., August, 1893.

4. *Exobasidium discoideum*, Ell.
   On *Rhododendron viscosum.*

5. *Exobasidium Cassandræ*, Pk.
   On *Cassandra calyculata.*

6. *Exobasidium Arctostaphyli*, Hark.
   On *Arctostaphylos pungens.*

7. *Exobasidium decolorans*, Hark.
   On *Rhododendron occidentale*, and *Rhododendron viscosum.*

The seven species have twelve hosts, and *E. Vaccinii* has two-thirds of all. Three species are confined as far as yet known to a single host each, and *Rhododendron viscosum* bears three species.

From an economic standpoint the *E. Vaccinii* is the only species destructive to any crop, namely, to the cranberry. During this summer samples were sent me from Massachusetts asking for a remedy, the young stems being much distorted by the fungus.

The members of the genus as a rule are conspicuous, the general characteristic being a much swollen leaf or branch. The common azalea or Pinxter flower (*Rhododendron nudiflorum*) is known in many places as the "Swamp apple," because so generally producing upon the tips of the branches swollen masses, large as, and superficially somewhat resembles, green apples, the work of *E. Azaleæ*, Pk. In the same genus on *Rhododendron viscosum* is *E. discoideum*, Ell., which develops upon the under surface of the leaves large, turbinate or discoid galls two or more centemeters in diameter. The *E. Vaccinii* upon some hosts causes the stem to enlarge to many times its normal size. Galls of *E. Andromedæ*, Pk. are cupuliform and lobed, the hollow cavity containing cottony fibers and are, as the author states,* "lateral or rarely terminal on living branches, transforming the leaf buds."

On the 30th of May last the writer's attention was attracted to a group of *Andromeda Mariana* plants in a roadway near Farmingdale, N. J. The tips of the stems, instead of bending somewhat to one side and hanging full of the large white corolla bells characteristic of the species, were bolt upright, shorter than usual and bearing capitate masses of a pale green color. Upon inspection

* Twenty-sixth Report of New York State Museum.

these were seen to be abnormally developed stems with their misshapen flowers in dense clusters. Some of the stems bore ordinary flowers a few inches below the malformed tips.

An examination assured me that the strange forms were due to an *Exobasidium*, and not being able to make it fit into any of the species described, was constrained to send specimens to Pro-

EXOBASIDIUM PECKII, HALS., CAUSING POLYPETALOUS FLOWERS IN ANDROMEDA MARIANA.

fessor Peck, who is the author of three of the American species of *Exobasidiums*, including the one upon *Andromeda* above mentioned. He reported it as unknown to him. It is therefore with much pleasure that this second *Exobasidium* upon the *Andromeda* genus, the first bearing the generic name *Andromeda* by Professor Peck, is to be called *Exobasidium Peckii*, in honor of a life-long faithful laborer in American Mycology.

This species is remarkable in being confined almost entirely to the infloresences where it causes most extravagant enlargement and distortion of parts. Some of the single flowers are more than an inch in length and in spread of petals, the bell-shaped corolla being replaced by one that is wheel-shaped and polypetalous. A full study of all the abnormal floral organs might show points of structure of ordinary blossoms with added clearness and possibly throw light upon obscure parts. The ovary, for example, is raised a half inch or more above the receptacle and the peculiar placentæ greatly exaggerated.

The accompanying engraving is made from a photograph of a group of a healthy and an affected branch, and shows the abnormally exaggerated almost polypetalous flowers in striking contrast with the corolla bells of the ordinary form.

BYRON D. HALSTED.

RUTGERS COLLEGE, Aug. 2, 1893.

A new Station for Epipactis viridiflora (Hoffm.) Reichenb.

During the last summer one of my former students, Mr. H. B. Cushing, B. A., found an orchid on Mt. Royal, which, upon careful examination, proves to be what he at first took it for, *Epipactis viridiflora*. He first observed it on August 5th, growing on a rather dry, wooded hillside on the western slope of Mt. Royal, not far from the Côte des Neiges road, and in the vicinity of an old garden; at that time it was just coming into bloom. On August 25th, in the same locality, and within a small area, he found thirty or forty more specimens. Most of these had already gone out of flower, and some of them had ripened their seeds.

This discovery is of special interest, since, with the exception of the recently found station at Toronto,* there is no other known locality for this plant in Canada.

In 1820 and the following years, Dr. A. F. Holmes made a very thorough examination of the entire Island of Montreal, yet this species does not appear in his collection, nor is it to be found

* Bull. Torr. Bot. Club xx. 36.

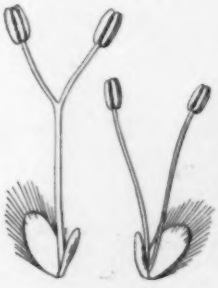
in any of the more recent works, such as those of Macoun and Provancher; and we are led to ask if this can be a recent introduction to our flora, or is it an old resident that has been wholly overlooked? The fact that it has not been found elsewhere in a district well known to local botanists, and that it occupies a very small tract, would seem to be opposed to the latter alternative.

D. P. PENHALLOW.

MONTREAL, October, 1893.

Botanical Notes.

Cohesion of the Filaments in Salix myrtilloides.—Dr. Masters, in his Vegetable Teratology, records two examples of the cohesion of stamens in the genus *Salix*. He remarks, without mentioning the way in which the stamens are united, that this monstrosity exists normally in *S. monandra*. His other case is *S. calyculata*, in which Professor Anderson found the stamens joined so as to form a tube.



While examining some specimens of *S. myrtilloides*, collected near Royal Oak, Oakland county, Mich., by Dr. Wright, the filaments of all the stamens of the male flowers on one branch were found to be united for about two-thirds of their length, whence they separated and were developed in the usual manner. The accompanying figure shows two male flowers, the smaller one taken from a normal catkin of *S. myrtilloides;* the larger is from the specimen referred to above and shows the filaments united as described.

JOHN K. SMALL.

*Notes on Cicuta maculata.**—Members of the Botanical Club are aware of the widespread belief that cultivated parsnip when running wild is supposed to be poisonous. This, I think, has been set at rest by Professor Power's excellent investigation. Through Mr. Eugene Brown, a graduate of the Iowa Agricultural College,

* Read by title before the Botanical Club, A. A. A. S. Madison meeting, August 1893.

I was permitted last spring to examine some roots in a case in which three children had consumed "Wild Parsnip." There were three boys respectively 5, 7 and 9 years of age. They were taken sick about one hour after eating the "Parsnip." The specimens sent me were excellently developed, and proved to be *Cicuta maculata*. Much of wild parsnip referred to commonly in Iowa is this species, and not the *Pastinaca sativa*. I might also report that I have eaten the wild *Pastinaca sativa* without injurious effects.

L. H. PAMMEL.

North American Fungi, Century XXX.—J. B. Ellis and B. M. Everhart: This, the 30th volume of the N. A. F., comes to hand in the neat form that has characterized all the preceding "Centuries." The volume contains a great variety of species ranging from *Æcidium* to *Venturia*, as shown by the alphabetical index. By groups, the "Century" opens with *Marasmus ramealis*, collected in West Virginia, by L. W. Nuttall (a strong botanical name) and closes with "3,000 *Hadotrichum Blasdalei*, Sacc. (in literis) on *Vicia gigantea*, Mill Valley, Cal., May, 1893, W. C. Blasdale." Several new species now first see the light as *Physalospora agrifolia*, E. and E., on leaves of *Quercus agrifolia*, Cal., W. C. Blasdale; *Leptosphæria occidentalis*, E. and E., on *Panicum Crus-galli*, Kansas, E. Bartholomew. In passing it may be said that the two above named persons have furnished a large number of interesting specimens. *Puccinia Blasdalei*, Diet. and Hol. (No. 2989) is another new species in which the California mycologist is honored. It was found by Mr. Blasdale on (?) *Allium serratum* in California in May of the present year. In like manner the Kansas collector gets full credit in No. "2990 *Puccinia Bartholomi*, Diet. Hedwigia, 1892, p. 290." On *Bouteloua oligostachya*, Rockport, Kas., January, 1893, E. Bartholomew." The editors of the N. A. F. present a new rust of their own in *Puccinia heterantha*, E. and E., on *Œnothera ovata*, collected by Blasdale in California, with specimens of laboratory cultures of its *Æcidium*, made by the discoverer. Also No. 2985 *Uromyces Chlorogali*, n. sp. (no authority given) on a *Chlorogalum*, a Blasdale-California find. There is a new smut, namely: No. 2983 *Urocystis Waldsteiniæ*, Pk. on *Waldsteinia fragarioides*, by C. L. Shear, an active worker in mycology at Alcove, N. Y. There is a good supply of the *Cer-*

cosporas, *Septorias* and *Phyllostictas* and *Peronospora Corydalis*, De By., is distributed. Near the last, but not least, are the teleutospore and æcidium forms of *Gymnosporangium globosum*, Farl.

B. D. H.

Duplicate Binomials.—My attention has recently been drawn to the use of specific names identical with the generic by H. Karsten, in his "Deutsche Flora," a pharmaceutical work of great value published in Berlin (?) from 1880 to 1883. As this antedates their acceptance in America, I here abstract those which apply to indigenous or introduced American plants. Our copy does not indicate the exact dates of the pages. Presumably the book was published in parts, and reference to an unbound copy will most likely be necessary for closer approximation than that given above.

Aruncus Aruncus (L.) Karst. Deutsche Flora, p. 779.
Batatas Batatas (L.) Karst. Deutsche Flora, p. 973.
Cakile Cakile (L.) Karst. Deutsche Flora, p. 663.
Catalpa Catalpa (L.) Karst. Deutsche Flora, p. 927.
Corallorhiza Corallorhiza (L.) Karst. Deutsche Flora, p. 448.
Coronopus Coronopus (L.) Karst. Deutsche Flora, p. 673.
Eragrostis Eragrostis (L.) Karst. Deutsche Flora, p. 389.
Fagopyrum Fagopyrum (L.) Karst. Deutsche Flora, p. 522.
Hepatica Hepatica (L.) Karst. Deutsche Flora, p. 559.
Lappula Lappula (L.) Karst. Deutsche Flora, p. 979.
Linaria Linaria (L.) Karst. Deutsche Flora, p. 947.
Negundo Negundo (L.) Karst. Deutsche Flora, p. 596.
Opuntia Opuntia (L.) Karst. Deutsche Flora, p. 888.
Petasites Petasites (L.) Karst. Deutsche Flora, p. 1062.
Petroselinum Petroselinum (L.) Karst. Deutsche Flora, p. 831.
Phragmites Phragmites (L.) Karst. Deutsche Flora, p. 379.
Sassafras Sassafras (L.) Karst. Deutsche Flora, p. 505.
Scolopendrium Scolopendrium (L.) Karst. Deutsche Flora, p. 278.
Sorghum Sorghum (L.) Karst. Deutsche Flora, p. 367.
Taraxacum Taraxacum (L.) Karst. Deutsche Flora, p. 1138.
Vincetoxicum Vincetoxicum (L.) Karst. Deutsche Flora, p. 1030.

N. L. B.

Reviews of Foreign Literature.

Revisio Generum Plantarum secundum leges nomenclaturæ internationales cum enumeratio plantarum exoticarum. Otto Kuntze (Part iii., Section 1, Leipzig, London, Milan, New York and Paris, 1893).

Since the publication of the first two parts of his now famous "Revisio," Dr. Kuntze has traveled extensively in South America and made large collections, the enumeration of which will make the greater portion of the third part of his work. On his return from his journeyings in the spring of the present year he found the questions of botanical nomenclature opened by his first volumes still considerably unsettled, at least in Europe, and determined to add to his previous important contributions to this subject.

The greater number of the pages at present noticed are taken up with the collation of everything that has been written on nomenclature during the last year and a half, with criticisms and suggestions thereon by the author, in which he naturally approves the remarks of those who have agreed with him, and pays his respects to those by whom he has been attacked. One hundred and twenty-four authors are cited and their writings abstracted nearly in full; of these, nineteen are Americans.

Chapters follow on "Orthographical License," in which a very complete list of similar but not identical generic names is presented, and a long series of principles proposed to determine which should be allowed to stand and which should be rejected, illustrating Dr. Kuntze's great linguistic attainments; on modifications of the Paris Code; on "1753, die Nomenclatur der Unbewussten," where he argues against the acceptance of the date of publication of the first edition of Linnæus' "Species Plantarum" as the point of departure in nomenclature of genera and species, thus disagreeing with the decision of the Genoa Congress, with that of the North American botanists and of the editors of the "Index Kewensis;" on "1737, der neue Compromise," where he indicates his present willingness to yield the 1735 date, in favor of 1737, and in this as in the preceding chapter gives a list of generic names which would be changed from those taken up in his previous

volumes. The paper closes with a proposed list of international symbols for briefly designating various features of plants and with a summary of the principles of nomenclature which he thinks should now be adopted, consisting of seventy-five articles printed in German, English and French.

That Dr. Kuntze's contributions to the science of plant nomenclature have been the most valuable, the most voluminous and the most important ever made goes without saying. Their results however prove conclusively to our mind that uniform international agreement on all poinis is unattainable by the recommendations of congresses or persons to which the whole botanical world is expected to fully assent. We believe that uniform usage can be secured, however, by the adoption of a series of simple principles, supplementary to and explanatory of the Paris Code of 1867, by a national group of botanists who will carry them out to the letter to the best of their knowledge and allow no exceptions whatever to interfere. This is what the North American botanists have well begun by the legislation effected at the Rochester and Madison meetings of the American Association for the Advancement of Science, and the preparation and printing of the catalogue of fern and flowering plants of Northeastern America there authorized, based on these principles, which is now in press.

We are more fortunate than our European brethren, inasmuch as we have no very great amount of inertia to overcome, and we have the instructive example of the previous work in just the same line by our ornithological colleagues, whose principles are receiving wider and wider adhesion, and who have not deviated one iota from their rules adopted some seven years ago. Bickerings over nomenclature are practically a thing of the past among our students of the feathered race. We believe that this millenium has arrived for our botanists. That errors will now and then be made in the readjustment of names is a necessary accompaniment of the conditions, but they can readily be corrected.

And this is the movement which the learned editor of the "Journal of Botany" facetiously and somewhat wrathfully alludes to as "the neo-American epidemic." Well, epidemics do a great deal of good, we believe, in the elimination of the weak and facilitating the survival of the fittest, and as to his compound adjective

we cannot object, for everything American is new, and long may it so remain. But what will he think some day if some feeble-minded person may happen to designate the methods which he advocates as "palæo-Anglic?" N. L. B.

Proceedings of the Club.

TUESDAY EVENING, OCTOBER 10, 1893.

The President in the chair and twenty-five persons present.

A communication from Mr. Hartley C. Wolle, of Bethlehem, Pa., addressed to the President, was read, presenting to the Club a copy of Turner's Fresh Water Algae of East India, said copy having been forwarded by the author to the father of the writer, the Rev. Francis Wolle, who however did not live to receive it.

A communication to the Secretary from Sr. Luis Sodiro, of Quito, Ecuador, was read, accepting the honor of a corresponding membership in the Club and presenting a copy of his work on the Vascular Cryptogams of Ecuador. Dr. Britton spoke of the value of this work.

The scientific programme of the evening was then taken up, and summer experiences were related.

Dr. C. C. Curtiss reported his experiences during the summer at Wood's Holl, at Gay Head and at Casco Bay, where he collected many algae.

Mr. John K. Small stated that he had collected in Georgia, where he had been especially interested in the mosses, but had made large general collections. He was able to report on extension of the range of many species, the rediscovery of a number of rarities and the finding of a number of new species.

Mr. A. A. Heller had interested himself especially in the Southern Virginia boundary, the limit of the Manual region. His most interesting work had been the addition of quite a number of plants to the Manual list, notably that of *Cyrilla*. He thought that in order for collectors to be successful in this region it was very necessary that they consult the proper seasons for visiting respectively the coast region, the foot hills and the mountains.

His collections amounted to 13,000 or 14,000 specimens, representing some 500 species.

Mr. T. H. Kearney, Jr., had been collecting in Tennessee and Kentucky. He had devoted some three months to this work and obtained more than 5000 specimens. He noted some of his more important observations.

Mr. Geo. V. Nash reported collecting in the Catskills and exhibited specimens of several interesting species.

Mr. Henry Kraemer reported upon some laboratory work, referring especially to Belladonna root. He had found in the cortical tissue structures bearing all the characteristics of bast and had afterwards encountered notes by Prof. Schrenk to the same effect, and had verified the same by an examination of Prof. Schrenk's specimens. The supposed bast could be detected only after clearing and staining.

Mr. Theo. G. White had been specially occupied in geological work. At Lake Champlain he had obtained from the Potsdam sandstone a fine large fossil alga. Later, while at the World's Fair, he had made some interesting collections of the prairie flora.

The President exhibited two specimens of *Solidago speciosa*, one collected by himself many years ago on the line of Sixth ave., between 135th and 140th streets, where also *S. rigida* used to grow, the other recently collected in Westchester county by Dr. Margaret B. Wilson.

Dr. Britton exhibited and remarked upon some numbers of the American Botanical Register, obtained from the library of Dr. Hosack. He had not as yet been able to find any reference to this publication.

Wednesday Evening, October 25, 1893.

Vice President Allen in the chair and twenty persons present.

The following papers were read:

1. "On the North American Species of the genus *Physcomitrium*," by Mrs. Britton. The paper was illustrated by specimens and drawings. The genus was originally described with three species, which in Lesquereux and James' "Manual" had been increased to six. Mrs. Britton's studies had led her to recognize eleven North American species, six of which she described as new.

The paper will be published in the BULLETIN at a future time.

2. "New Genera from Bolivia," by Dr. Rusby. The paper was illustrated by specimens and drawings, and is printed in this number of the BULLETIN.

Dr. Britton referred again to the copy of the "American Botanical Register," which he had exhibited at the preceding meeting, stating that he had found a reference to the work in Silliman's Journal for 1831, in the form of a prospectus where 100 colored plates of North American plants were proposed to be issued each year at a subscription price of $12.00. Washington was the place of publication.

He also exhibited a copy of Jung and Berlese's "Monographie du Genre *Camellia*," and *Viola Selkirkii*, *Amelanchier oligocarpa* and *Rubus setosus* from the Pocono plateau of Pennsylvania.

TUESDAY EVENING, NOVEMBER 14, 1893.

The President in the chair and thirty persons present.

A letter was received from Mr. E. D. McCabe, executor of the estate of Miss Phœbe A. McCabe, stating that her herbarium had been shipped to the Club, as per previous correspondence. It contains a large number of Westchester county plants.

The following persons were elected active members:

S. B. Parsons, Flushing, Long Island, N. Y.

Dr. G. Langman, 121 West 57th St., New York City.

The President stated that the herbarium accumulated by the late Mr. P. V. LeRoy, formerly Curator of the Columbia College Herbarium, and long a member of the Club, was offered for sale by his daughter, Mrs. Williams, of Peekskill, N. Y.

The Treasurer reported that the Club had received a bequest of $500.00 under the will of the late Isaac Buchanan, and that payment of the money was expected at some time during the coming year.

The following papers were read:

1. "Solandi Printing and its Applications to Botany," by Prof. Byron D. Halsted. The paper was illustrated by examples of the results obtained by the process of printing, and will be published in the December number of the BULLETIN.

2. "On the Altitudinal Distribution of Appalachian Ferns," by Mr. John K. Small. The paper was illustrated by specimens and a map, and will be published in the December number of the BULLETIN.

Index to Recent Literature Relating to American Botany.

Arthrophycus—Remarks on the Genus. Jos. F. James. (Journ. Cin. Soc. Nat. Hist. xvi. 82–86).

This paper was presented before Sec. E. of the A. A. A. S. at the Madison meeting, and was noted in the BULLETIN for September, 1893.

Asplenieas—Observaciones sobre algunos Helechos de la Tribu de las. Jose N. Rovirosa. (Naturaleza, ii. 179, illustrated).

Botanical Report. Brittain and Coxe. (Bull. Nat. Hist. Soc. New Brunswick, viii. 119).

Contains a list of rare plants found on a trip down the Restigouche, in July, 1888.

Cereus Peruvianus—Die Blüthe von. K. Schumann (Monatsch. Kakteenkunde, iii. 123).

Compositæ—Achenial Hairs of. Mary A. Nichols (Bot. Gaz. xviii. 378–383; one plate).

Cretaceous Floras in Canada and the United States, and on some new Plants of this Period—On the Correlation of early. J. W. Dawson (Trans. Roy. Soc. Canada, x. Sec. iv. 79–93, figs. 1–16.

The author begins with a review of previous work on the Cretaceous plants of British America and their correlation with such as had been found in the United States and Greenland.

The plants which are described were collected in the Cascade Coal Basin of the Rocky Mountains, and are all referred to the Kootanie formation. *Angiopteridium Canmorense* and *Pinus anthraciticus* are described and figured as new. A. H.

Cryptogamæ Vasculares Quitenses adiectis speciebus in aliis provinciis ditionis Ecuadorensis hactenus detectis. Auctore Aloisio Sodiro S. J. (8vo, Quiti, Typis universitatis, 1893, pp. 656, with index and 7 plates.)

In a short introduction the author states that although the fern flora of Quito had been previously collected both by Jameson and Spruce yet so rich is it in numbers and so extensive the still unexplored parts of Equador that he has been able to contribute many new species. In 1883 he published a work entitled "Recensio Cryptogamarum Quitensium," and the present one is intended not so much as an enumeration of the new species as a text-book to encourage others to further search. Hence, besides the Latin descriptions, there is a Spanish one for each species. The plates are all drawn from specimens in his herbarium, and there are keys for all the genera. This is unquestionably a valuable contribution to the literature of the ferns and their allies as well as a work of considerable importance on the local flora. E. G. B.

Cycad—A New: T. H. McBride (Am. Geol. xii. 248–250, Pl. xi.)

An illustrated description of a new species *Bennettites Dacotensis*, allied to *B. Gibsonianus*, Carr., found near Minnekahta, S. Dakota, in rocks which are probably of Lower Cretaceous age.

Cypripedium montanum. J. D. Hooker (Curt. Bot. Mag. xlix. tab. 7319.)

Does our Indegenous Flora give evidence of a recent change of climate? J. Vroom (Bull. Nat. Hist. Soc. New Brunswick, vii. 72–74.)

Echinocereus Salm Dyckianus. K. Schumann (Monatsch. Kakteenkunde, iii. 127, illustrated.)

Embryo-sac in Acer rubrum—Development of the. David M. Mottier (Bot. Gaz. xviii. 375–378, one plate.)

Ferns—Synoptical List. G. S. Jenman (Bull. Bot. Depart. Jamaica, Nos. 46–47, 1893.)

Species of the genus *Asplenium* are described.

Flora Brasiliensis—Fasciculus cxiii. Sapindaccæ 1. L. Radlkofer (Folio, pp. 225–356, tab. 58–80.)

This part is entirely occupied with the the treatment of the genus *Serjania*, of which 81 Brazilian species are recognized, most of them first made known by the author in his previous extensive contributions to the literature of this group.

Flora Brasiliensis—Fasciculus cxiv. Orchidaceæ 1. A. Cogniaux (Folio, pp. 1–160, tab. 1–34.)

The genera, species and tribes of Cyripedilinæ, Ophrydinæ and Neottiinæ are here described.

Fossil Fungi. Jos. F. James (Journ. Cin. Soc. Nat. Hist. xvi. 94–98. Translated from the French of R. Ferry, in Rev. Mycologique, April (1893), 54–56.)

The author has performed a good deed in presenting this translation for the benefit of American readers. He also adds a few remarks and references at the close, which were not included in the original paper.

Fungus Diseases of the Sugar Beet. L. H. Pammel (Am. Mo. Mic. Journ. xiv. 189–200. Repr. from Bulletin No. 15, Iowa Agricultural Experiment Station.)

Halesia—The Use of the Generic Name. N. L. Britton (Gard. & For. vi. 433, Oct. 18, 1893; 463, 464, Nov. 8th, 1893. Edw. L. Greene, Erythea, i. 236, Nov. 3, 1893.)

The name *Halesia*, P. Br., is shown to belong to a West Indian tree, now referred to *Guettarda*, L., and *Mohria* is proposed to replace the later *Halesia*, Ellis, by Dr. Britton in his communication to "Garden and Forest," printed in the issue of that journal of October 18th. His attention having been called to the publication of a genus *Mohria* by Swartz in 1806 for a South African genus of ferns, and that in the attempt to correct one hononym he had inadvertently made another, Dr. Britton, in the issue of "Garden and Forest" for November 8th, proposes the name *Mohrodendron*. In both communications the species are named, thus effecting publication under Section 2 of the rules adopted by the Botanical Club of the American Association for the Advancement of Science at the Rochester meeting. Prof. Greene, in the issue of "Erythea" for November 3d, proposes the generic name *Carlomohria*, this name thus having five days' priority over *Mohrodendron*. But he neither publishes a description of the genus nor names species belonging to it, and thus, under the same section of the Rochester rules, has not effected publication. All three of the names have been given in honor of Dr. Charles Mohr, of Mobile, Alabama.

Hepaticarum species novæ III. F. Stephani (Hedwigia, xxxii. 204–214).

This is taken up with descriptions of new *Bazzanias*, among them one from Magellan, and one from Peru.

Inter-twining of Tendrils. D. T. MacDougal (Bot. Gaz. xviii. 396–397).

Notes on the tendrils of *Micrampelis echinata* and *Parthenocissus quinquefolia.*

Juniperus—Fructification of. John G. Jack (Bot. Gaz. xviii. 369–375; one plate).

Lake Superior Region—A Contribution to the Flora of the. L. S. Cheney (Trans. Wisc. Acad. ix. 233).

Three hundred and forty-five species are listed, including Musci and Hepaticæ.

Mamillaria radiosa, Engelm. (Monatssch. Kakteenkunde, iii. 132, illustrated).

Marine Algæ of the Maritime Provinces. G. U. Hay (Bull. Nat. Hist. Soc. New Brunswick, vi. 62–68).

Comprises a list of 84 species with notes.

Notes on a small Collection of Plants, collected in Southwest Colorado by Mr. J. Cardwell Lees. J. C. Melvill (Mem. and Proc. Manchester Lit. and Phil. Soc. vii. 4th Ser. 214–219).

Penicillium and some other Fungi. H. L. Osborn (Amer. Month. Micros. Journ. xiv. 241–249).

Philosophy of Flower Seasons—The. Henry L. Clarke (Am. Nat. xxvii. 769, reprint).

Pontederia cordata, L.—The Histology of the Stem of. E. M. Wilcox (Journ. Cincin. Soc. Nat. Hist. xvi. 101, illustrated).

Prenanthes alba (Meehan's Month. iii. 161, illustrated).

Problematic Organisms—Studies in.—No. ii. The Genus Fucoides. Jos. F. James (Journ. Cin. Soc. Nat. Hist. xvi. 62–81. Pl. III.–V.).

In this contribution the author has performed an act for which many will be grateful. He has first of all included a full translation of Brongniart's little known paper published in Mem. Soc. Hist. Nat. Paris i. (1823) 301–321, entitled "Observations on *Fucoides* and on some other Fossil Marine Plants." The evil

which Brongniart inevitably invited is pointed out, viz: that the genus *Fucoides* as defined by him, was so broad that it was made the dumping ground for all sorts of fossils, inorganic markings and casts. About 100 different species and varieties have been included under it. Subsequent work by Brongniart and by Sternberg is referred to, in which the attempt was made to divide *Fucoides* into genera and sub-genera in accordance with supposed affinities with living genera. These and other described forms are criticised as to their algal affinities, and in many instances as to their organic or inorganic origin by the author, who finally ends with a list of the species which have been described under the genus *Fucoides*, with authority and date of publication, together with the names under which they are now recognized. The author has followed the rule of priority in nomenclature, so that many changes in name may be noted. Thus *Fucoides Alleghaniensis*, Harlan (1831), becomes *Arthrophycus Alleghaniensis* (Harlan) and not *A. Harlani*, Hall (1852). The only species which the author would retain under the old genus *Fucoides* is *F. strictus*, in accordance with laws of nomenclature, one of which "requires that the first species of a genus proposed be taken as the type of that genus." A. H.

Ruthenium Red in Plant Histology. A. B. Aubert (Am. Mo. Micr. Journ. xiv. 232).

Translation and condensation of a communication to the Academie des Sciences, Paris, December 26, 1892, by Mr. A. Joly.

Salix—A Study of the Venation of. N. M. Glatfelter (Ann. Rep. Miss. Bot. Gard. v.; reprint; illustrated).

Sketch of the Botany of Ireland. A. G. Moore (Journ. Bot. xxxi. 299–304).

Notes on a considerable number of Irish plants. Chapter 1 deals with the American species represented: *Spiranthes Romanzoffiana*, now known from several stations, *Sisyrinchium angustifolium* at several Galway and Kerry localities, but not certainly indigenous, *Juncus tenuis* and the recently observed *Polygonum sagittatum* (misspelled *sagittifolium*), pretty clearly introduced.

Vacation Collecting. W. Whitman Bailey (Bot. Gaz. xviii. 395).

Notes on plants found at Little Compton, R. I. *Senebiera Coronopus* is reported as occurring in great abundance.

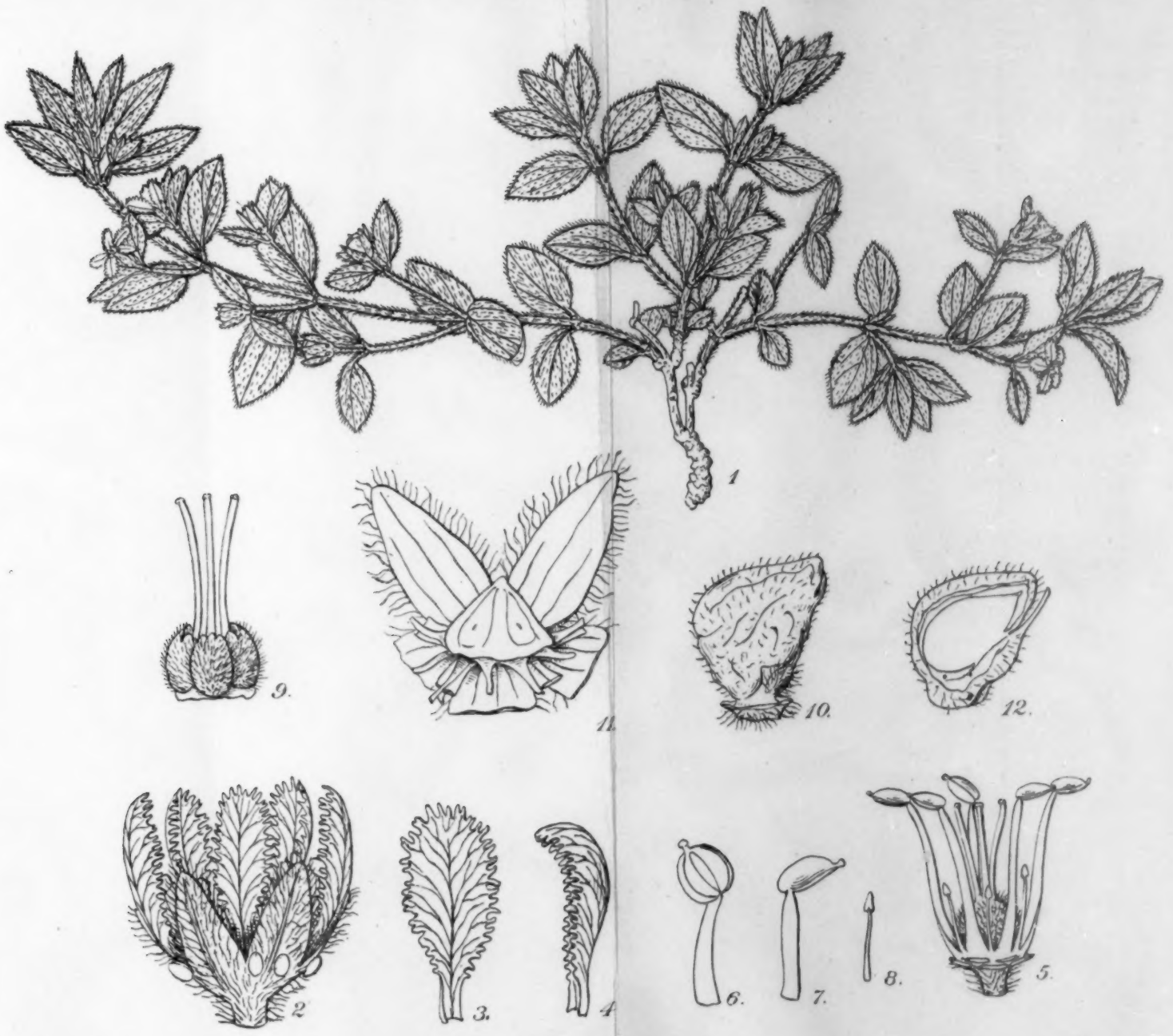
Winchellia—The Genus. N. H. Winchell (Am. Geol. xii. 209–213, Pl. VIII., IX.).

This article is based upon a specimen representing a new Cretaceous genus, from the Yellowstone River, of which the description with accompanying figures was prepared by Leo Lesquereux, who proposed to name it after the author. During the delay and uncertainity, incident to publication by the United States Geological Survey, Rev. Mr. Hertzer chose the same name, for a new genus of Carboniferous trees, in honor of Alexander Winchell. The same name was also about to be applied by another palæontologist to a new genus of mollusks.

The details of whatever friendly controversy ensued are not given, but eventually the name was cancelled for the molluscan genus and the name *Winchellina* was adopted for the Carboniferous tree, thus leaving the way clear for the publication of Lesquereux's original name. The species is described and figured therefor as *Winchellia triphylla.* Its affinities are with the Berberidaceæ, and in order to emphasize this there is given a figure of a leaf of *Achlys triphylla*, D. C., for purposes of comparison.

But the matter of greatest interest connected with it is that we have in this new fossil, the leaf of a plant which belongs to an order now recognized in the fossil form for the first time in America. Further than this, a comparison of the pods of *Jeffersonia diphylla*, with certain fossil fruits from the tertiary lignites of Brandon, Vt. (originally described as *Carpolites Brandonianus*, Lesq.), show that these are evidently closely allied to each other, if not actually belonging to the same genus.

In order that the comparisons may be readily appreciated, the illustrations include in addition to the leaves of *Winchellia triphylla* and *Achlys triphylla* the fruit *Carpolithes Brandonianus*, and a pod of *Jeffersonia diphylla.* A. H.



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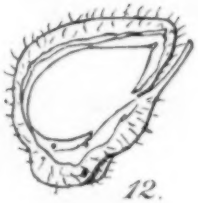

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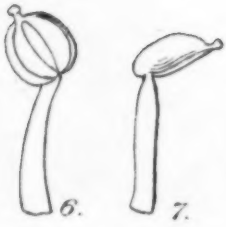

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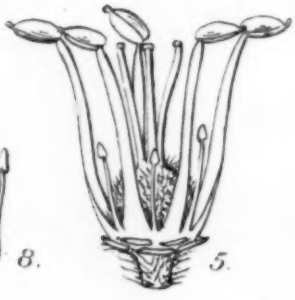

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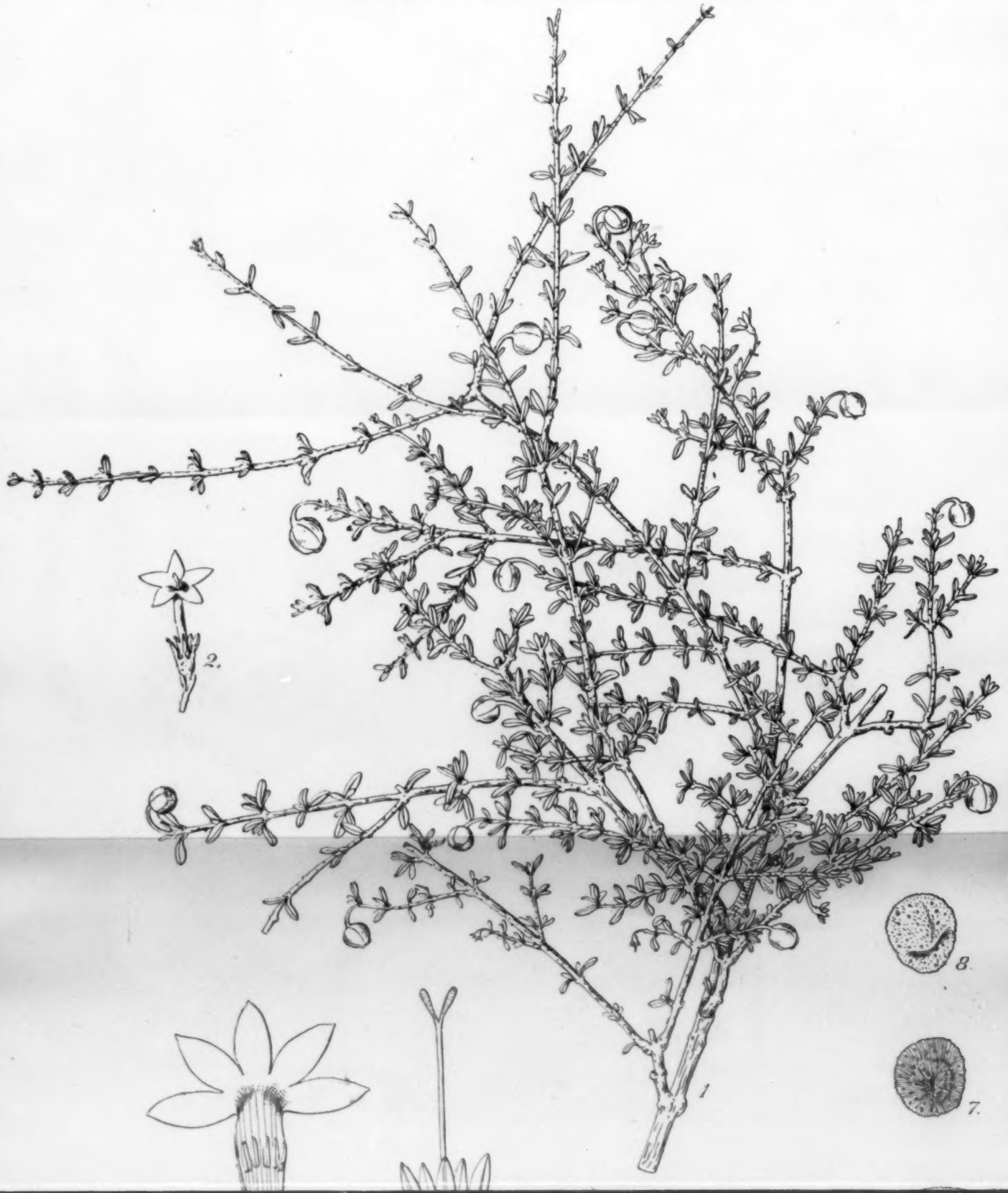
LOSA, RUSBY.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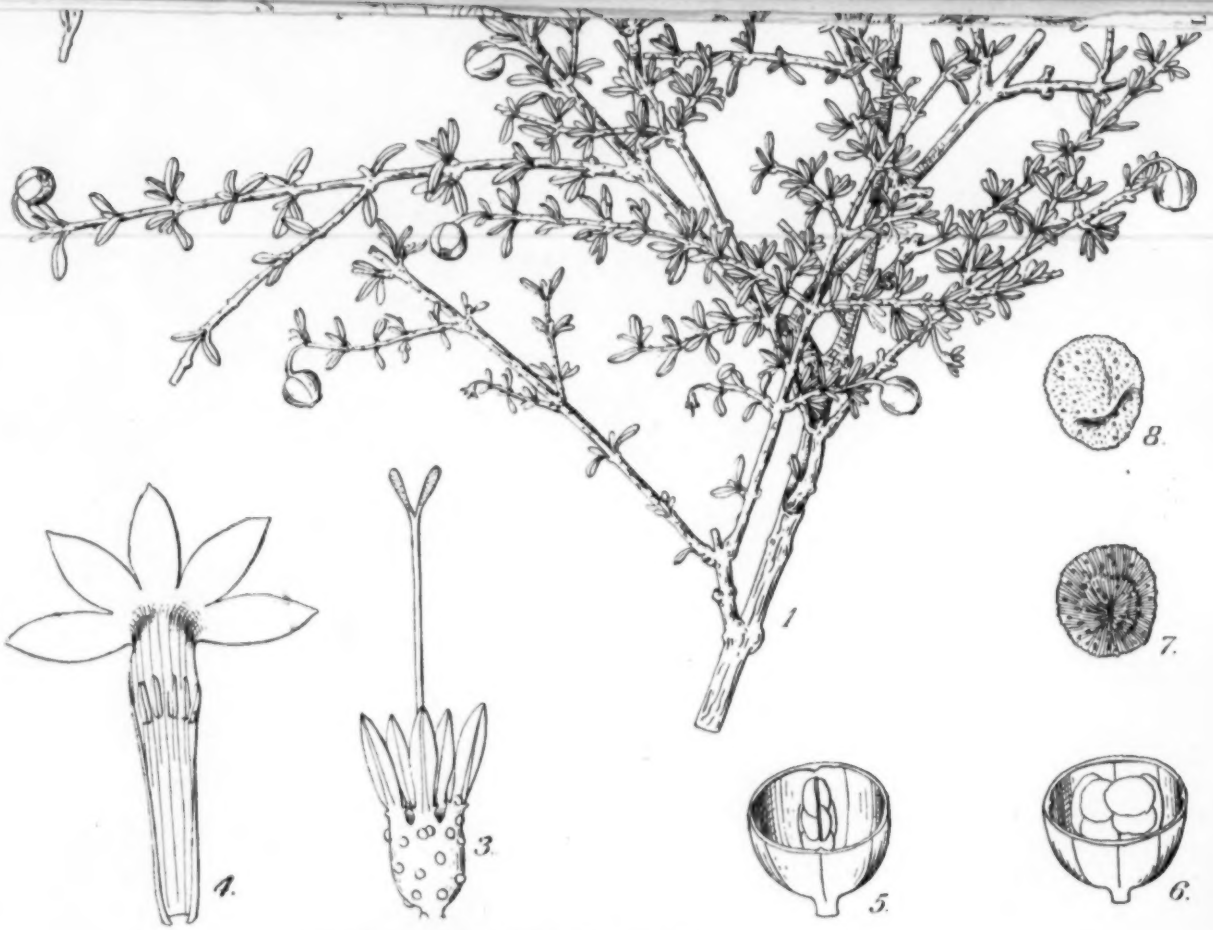
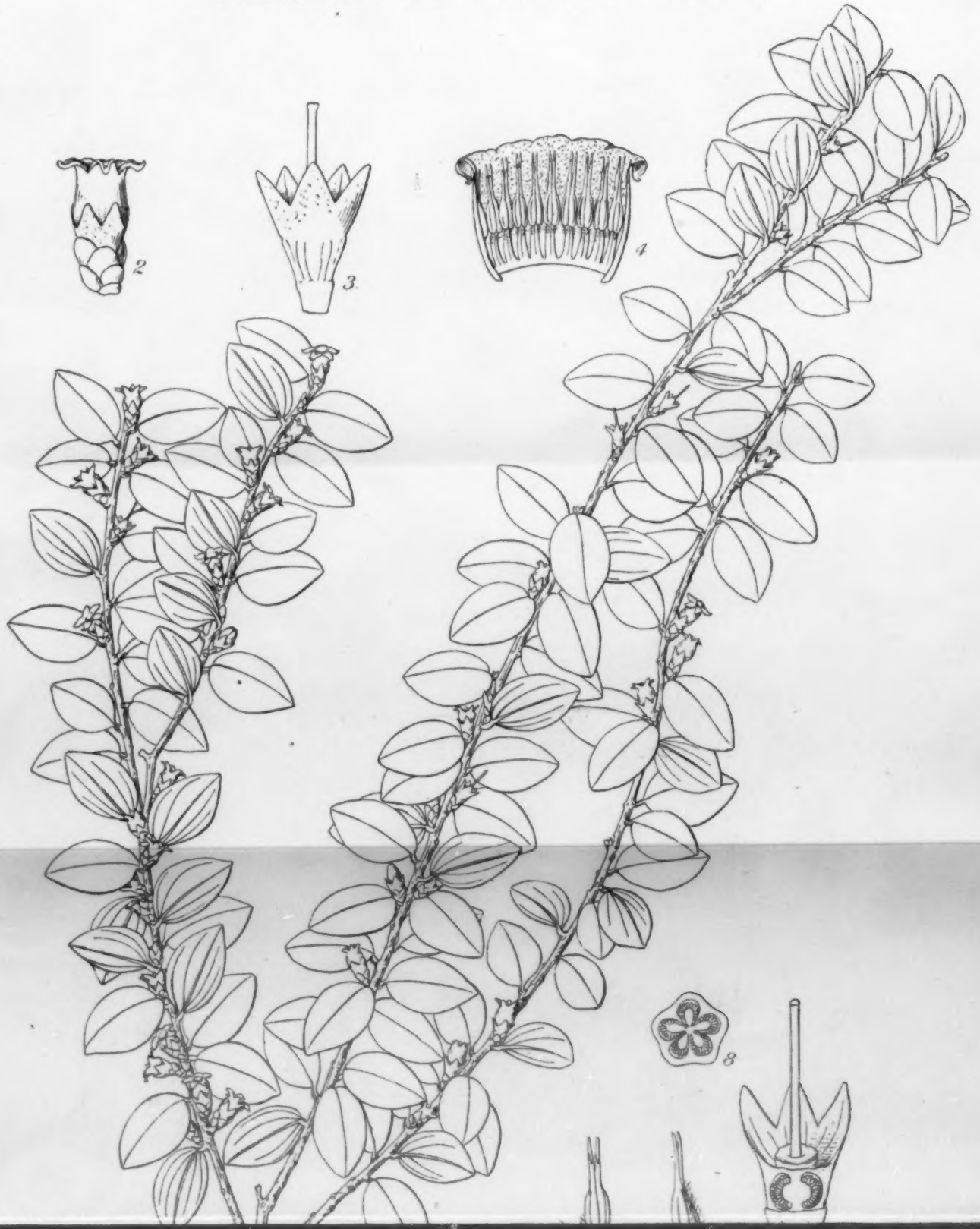


LECANOSPERMA LYCIOIDES, RUSBY.

BULLETIN OF THE TORREY BOTANICAL CLUB.—PLATE CLXIX.

ADDISONIA VIRGATA, RUSBY.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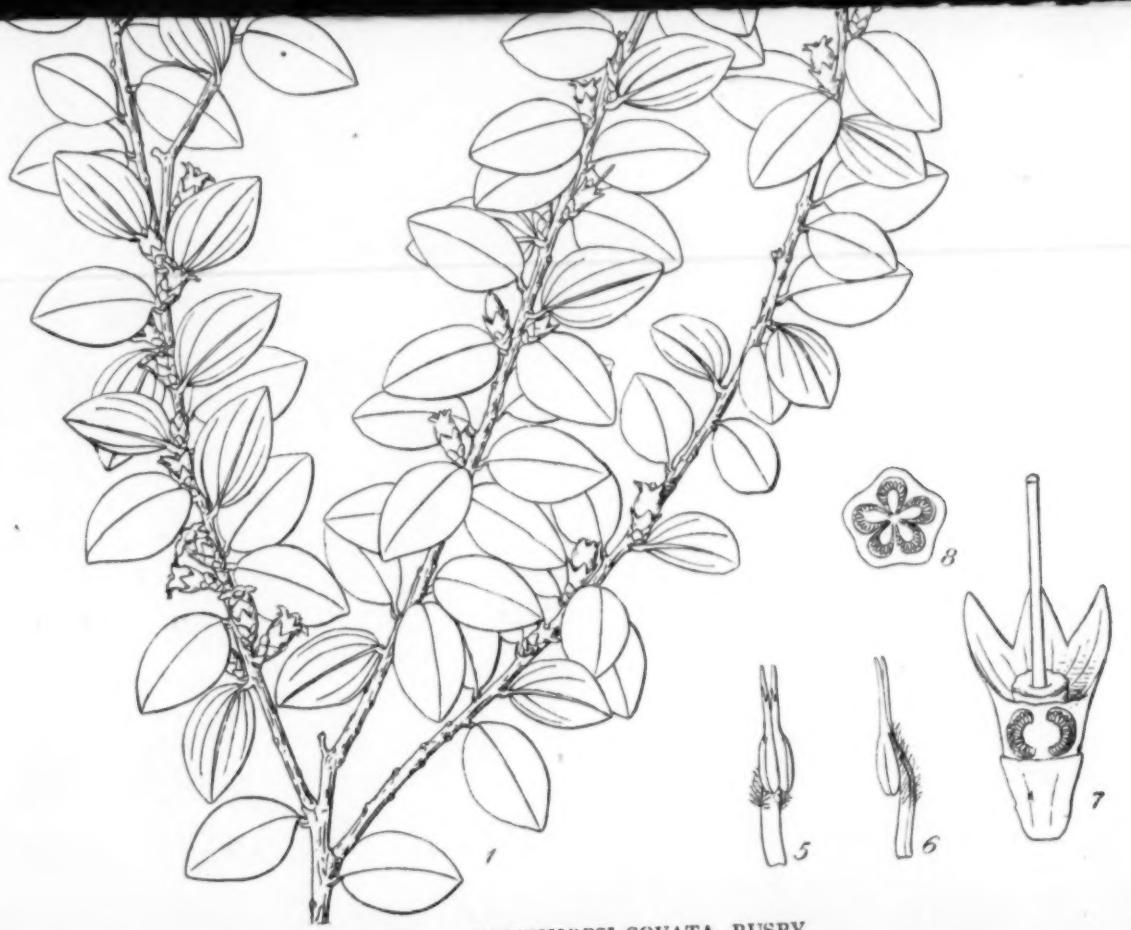

VACCINIOPSI SOVATA, RUSBY.

Contributions from the Herbarium of Columbia College.

No. 1. A Preliminary List of North American Species of *Cyperus*, with Descriptions of New Forms. By N. L. Britton (1886), ... 25 cents.

No. 2. *Cerastium arvense*, L., and its North American Varieties. By Arthur Hollick and N. L. Britton (1887). (Out of print.)

No. 3. Plant Notes from Temiscouata County, Canada. By J. I. Northrop (1887). (Out of print.)

No. 4. A List of Plants Collected by Miss Mary B. Croft at San Diego, Texas. By N. L. Britton and H. H. Rusby (1887), ... 25 cents.

No. 5. New or Noteworthy North American Phanerogams. By N. L. Britton (1888), ... 25 cents.

No. 6. An Enumeration of the Plants Collected by Dr. H. H. Rusby in South America, 1886–1887. By N. L. Britton. (Twenty-three parts published; not yet completed.)

No. 7. The Genus *Hicoria* of Rafinesque. By N. L. Britton (1888), . . . 25 cents.

No. 8. A Recent Discovery of Hybrid Oaks on Staten Island. By Arthur Hollick. (1888), ... 25 cents.

No 9. A List of Plants Collected by Dr. E. A. Mearns at Fort Verde and in the Mogollon and San Francisco Mountains, Arizona, 1884–1888. By N. L. Britton.

The General Floral Characters of the San Francisco and Mogollon Mountains and the Adjacent Region. By H. H. Rusby (1888), ... 25 cents.

No. 10. Contributions to American Bryology—An Enumeration of the Mosses Collected by Mr. John B. Leiberg in Kootenai County, Idaho. By Elizabeth G. Britton. (Out of print.)

No. 11. Preliminary Notes on the North American Species of the Genus *Tissa*, Adans. By N. L. Britton (1889), ... 25 cents.

No. 12. The Genus *Eleocharis* in North America. By N. L. Britton (1889), 25 cents.

No. 13. New or Noteworthy North American Phanerogams, II. By N. L. Britton (1889), ... 25 cents.

No. 14. A List of State and Local Floras of the United States and British America. By N. L. Britton (1890), ... $1.

No. 15. A Descriptive List of Species of the Genus *Heuchera*. By Wm. E. Wheelock (1890), ... 25 cents.

No. 16. New or Noteworthy North American Phanerogams, III. By N. L. Britton (1890), ... 25 cents.

No. 17. The Flora of the Desert of Atacama. By Thos. Morong (1891), 25 cents.

No. 18. Contributions to American Bryology, II. A supplementary Enumeration of Mosses collected by Mr. John B. Leiberg in Kootenai County, Idaho. By Elizabeth G. Britton (1891), ... 25 cents.

No. 19. Notes on North American Haloragæ. By Thos. Morong (1891), . 25 cents.

No. 20. New or Noteworthy North American Phanerogams, IV. By N. L. Britton. (1891), ... 25 cents.

No. 21. Notes on the North American Species of Eriocauleæ. By Thos. Morong (1891), ... 25 cents.

No. 22. New or Noteworthy North American Phanerogams, V. By N. L. Britton (1891), ... 25 cents.

No. 23. The American Species of the Genus *Anemone* and the Genera which have been referred to it. By N. L. Britton (1891), ... 25 cents.

No. 24. Review of the North American Species of the Genus *Xyris*. By Heinrich Ries (1892), ... 25 cents.

No. 25. A Preliminary List of the Species of the Genus *Meibomia* occurring in the United States and British America. By Anna M. Vail (1892), . 25 cents.

No. 26. A List of Species of the Genera *Scirpus* and *Rynchospora* occurring in North America. By N. L. Britton (1892), ... 25 cents.

No. 27. Note on a Collection of Tertiary Fossil Plants from Potosi, Bolivia. By N. L. Britton (1892), ... 25 cents.

No. 28. The Anatomy of the Stem of *Wistaria Sinensis*. By Carlton C. Curtiss (1892), ... 25 cents.

No. 29. New or Noteworthy North American Phanerogams, VI. By N. L. Britton (1892), ... 25 cents.

No. 30. *Ranunculus repens* and its Eastern North American Allies. By N. L. Britton (1892), ... 25 cents.

No. 31. A Preliminary List of American Species of *Polygonum*. By John K. Small. (1892), ... 25 cents.

No. 32. West Virginia Mosses. By Elizabeth G. Britton (1892), ... 25 cents.

No. 33. A New Species of *Listera*, with Notes on Other Orchids. By Thos. Morong. (1893), ... 25 cents.

No. 34. The North American Species of *Lespedeza*. By N. L. Britton (1893) 25 cents.

No. 35. An Enumeration of the Plants Collected by Dr. Thos. Morong in Paraguay 1888–1890. By Thomas Morong and N. L. Britton, with the assistance of Miss Anna Murray Vail (1892–1893). . . . . $1.50.

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